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Cosmetic Pad and Method for the Production thereof

The invention concerns a cosmetic pad which is suitable for cleaning skin, in particular for peeling skin, and a method for manufacturing this cosmetic pad.

Cosmetic pads which are suitable for peeling skin, i.e. in particular cosmetic pads are known in the art. The pads have a side which feels soft and a roughened side which is used for peeling, i.e. the removal of dead, peeled skin.

EP 113602482 discloses a peeling pad which has a continuous plastic coating. The plastic coating consists essentially of a hardened plastic which is initially introduced onto the cosmetic pad in a liquid state and subsequently hardens. An abrasive material is worked into the plastic. This pad has the associated disadvantage that the liquid plastic can penetrate into the fiber materials of the cosmetic pad to excessive depths prior to hardening. In another embodiment, the plastic coating is a prefabricated foil having an abrasive surface and is introduced onto the surface of the cosmetic pad using a bonding substance. The use of a bonding material is difficult from a procedural point of view, is expensive, and also degrades the absorptivity of the cosmetic pad. Moreover, both embodiments have the additional disadvantage that the continuous plastic coating hinders accessibility to the fiber material. The coated side of the cosmetic pad is therefore no longer available for accepting body or cleaning fluids. Moreover, the continuous plastic coating leads to a

stiffening of the pad which is uncomfortable for the user and causes hard corners on the product.

EP-1283019-A1 discloses a cosmetic pad having a discontinuous coating which is intended to give the cosmetic pad an abrasive surface. The discontinuous coating consists essentially of plastic which is introduced in a molten state onto at least one side of the cosmetic pad, in particular as a hot melt. This product has the disadvantage of having low abrasive action, since the surfaces of the plastic particles are predominantly round due to the fact that the plastic is introduced in a molten state. Moreover, the melted plastic particles tend to penetrate into the fiber material of the cosmetic pad to an excessively large depth. Moreover, it has turned out that the size of plastic particles is inappropriately matched to the requirements for a peeling pad. Examples 1 and 2 disclosed in this publication have plastic particles with a diameter of 1.28 mm or 1.36 mm and a height of only 0.08 mm or 0.04 mm.

It is therefore a purpose of the present invention to present a cosmetic pad having a surface roughness which is suitable for peeling while avoiding the above mentioned disadvantages.

This objection is achieved in accordance with the invention with a cosmetic pad having a fiber layer, wherein at least one side of the cosmetic pad has a rough surface which is fashioned by sintering on abrasive material particles.

Abrasive particles which are introduced in sintered form do not tend to penetrate into the fiber structure more than is necessary for bonding.

The reversal in the sequence of the states of the abrasive material from "first molten and then solid" as in EP-1283019-A1 to "first solid and then molten" in accordance with the instant invention, simplifies tuning of the surface roughness and, in particular, permits an increase in that roughness. In contrast to prior art, the sintering process does not require complete melting of the plastic. On the contrary, the plastic materials are only melted on a surface thereof. The abrasive material can advantageously be made from a thermoplastic, meltable gluing powder or be worked into a meltable gluing powder.

The meltable gluing powder can be introduced onto one side of the non-woven fiber from which the pads are later formed in the form of a powdery component e.g. using a precision distributor and a vibrating sieve and the powdery component can be thermally fixed at that location. The powder can be introduced via a preferably automatically fillable funnel with the assistance of a doctor blade and be disposed in the intermediate spaces of a spiked roller, functioning as a distributor roller. The material is brushed out of the intermediate spaces of the distributing roller and onto the underlying non-woven fiber carrier material from which the cotton pad is subsequently made and is evenly distributed thereon with the assistance of a brushing system, i.e. an oscillating spiked band or oscillating brush or with the assistance of a brushing roller.

Templates can also be useful for forming various designs and patterns in various colors. The meltable gluing powder is preferentially doctored via a conveyor screw of a rotating sieve and introduced onto the template preferentially via a double doctoring blade system to pass through the

template and be doctored onto the underlying carrier material. A plurality of templates can be used in series in order to generate a multi-colored, registered pattern.

The thermal bonding is preferentially effected using a sintering process in an oven by means of convective heat transfer. IR radiation using an IR sintering station can also be used. Towards this end, the abrasive material is not melted rather the particles are bound to the pad while maintaining their rough surface structure, however, with a rounding of the IR surfaces and optionally connect to each other during the sintering process, wherein only the surfaces of the particles are softened or melted.

The polyethylene which is advantageously used as a meltable glue powder is preferentially LDPE with a melting range of 100 to 114 °C and/or polyamide, preferentially co-polyamide, with a melting range of 110 to 127 °C and/or polyester, preferentially co-polyester, with a melting range of 105 to 115 °C, and with a grain size of 1 to 500 μm, in particular 1 to 100 μm and preferentially 1 to 65 μm. It has turned out to be convenient and advantageous when the abrasive material is introduced with a surface density of 5 to 50 g/m^2, in particular of 10 to 40 m^2, and preferentially from 15 to 30 g/m^2. The powder can be colored or colorless.

In a particularly preferred embodiment of the invention, the sintered abrasive particles have a diameter of 50 to 400 μm, in particular 100 to 350 μm and especially preferred between 150 and 300 μm. These

dimensions refer to the longest extension of an abrasive particle projected onto the flat surface of the cosmetic pad.

The sintered abrasive particles preferentially have a height of 50 to 400 μm, in particular between 100 and 350 μm and especially preferred between 150 and 300 μm. This height refers to the maximum extent of a abrasive particle perpendicular to the flat fiber layer surface of the cosmetic pad.

In a particularly advantageous embodiment of the invention, the ratio of the diameter to the height of the sintered abrasive particles is not more than 10:1, preferably not more than 7:1, particularly not more than 3:1, and preferentially not more than 1.5:1.

It is turned out that the above mentioned sizes of the sintered abrasive particles are particularly suitable for effecting a peeling action which is considered pleasant.

The sintering technology makes it possible to dimension the size of the abrasive material of the cosmetic pad in the above mentioned regions since, as described, the sintering process only softens the surface of the particles. The fiber layer of the cosmetic pad can comprise up to 100 % per weight of cotton fibers.

In an advantageous embodiment, the cosmetic pad has micro staple fibers preferably having a length of at least 7 mm.

The term micro staple fibers is defined herein to be synthetic fibers having a fiber thickness of ≤ 1 dtex. Therefore, the terminology "micro staple fibers" means that micro fibers are used for manufacturing the non-woven fiber layer of the pad which have been previously produced in a separate manufacturing process having a certain length or a certain length range. It has turned out that synthetic micro staple fibers give the pad an increased softness and therefore an excellent haptic sensation for the user. Surprisingly, however, this soft feeling does not thereby result in a decrease in the cleaning or make-up removal effectivity. On the contrary, the pad in accordance with the invention comprising or consisting of synthetic micro staple fibers preferentially having lengths of at least 7 mm have superior cleaning and make-up removal properties.

These improved properties may be due to the large surface which the thin micro staple fibers have which is therefore available to come in contact with the surface of the skin. This large surface consequently borders a corresponding number of micro size gaps and openings which can accept impurities, peeled skin or make-up.

The fiber length of the micro staple fibers is preferentially 10 to 38 mm, in particular 15 to 32 mm.

In further improvements of the invention, the micro staple fibers in accordance with the invention can include polyester (PES) or viscose fibers. The surfaces of the micro staple fibers are preferentially hydrophilic. It is also possible for some of the surfaces of the cotton pads to have an imprinted pattern. Such an imprinted pattern can be effected in a conventional fashion i.e. using a calendar stamp or, as disclosed in

EP 1106723-A2 or W0-99/25318-A1 by water jet needling. Together with the production of a printed pattern, a strengthening of the non-woven material can also take place. The strengthening of the non-woven material can also be enhanced by the addition of heat meltable binding fibers or through the addition of chemical binding materials such as watery polymer dispersions e.g. polyacrylate, polyvinylacetate, polyvinyl alcohol, latices or binding materials on the basis of solvents or polyurethane, powder glues or meltable glue powder made from polyamide, polyethylene, ethylene vinyl acetate, polyurethane or polyester.

The surface density of the cosmetic pad in accordance with the invention is preferentially between 40 and 300 g/m², in particular between 60 and 250 g/m², preferably between 120 to 250 g/m², and most advantageously between 150 to 250 g/m².

For applications in which the micro fiber cosmetic pad is to accept liquids, for example, absorb a solution used to clean the face or for the removal of make-up using a make-up removal material having a high liquid component portion, the pad advantageously has an additional amount of up to 72 % per weight of cotton fibers, in particular 15 to 65 % and preferably 50 to 65 % by weight. Hereby, one preferably uses cotton noils. The pad can include cotton fibers which have at least 0.2 % per weight of a softener. This softener can be a fatty acid condensation product and/or a functional polydimethysiloxin and/or polyethylene.

Moreover, internal strength of the cosmetic pad in accordance with the invention can be advantageously increased with additional heat-meltable

binding fibers, preferentially 10 to 20 % per weight, which are used for thermal strengthening of the cotton pad. The fraction of heat-meltable binding fibers is in particular 12 to 18 % by weight, and preferably 12 to 15 % by weight relative to the mass of the cotton pad.

In a further embodiment of the invention, the binding fibers can be multi-component fibers, in particular bicomponent fibers with a carrier component having a higher melting temperature and a melting component having a lower melting temperature.

Multi-component fibers, in particular bicomponent fibers, preferentially have a fiber thickness of 1.3 to 10 dtex, in particular 1.3 to 3 dtex and a fiber length of 3 to 60 mm. Core jacket fibers or side-to-side fibers are preferentially used.

It has turned out to advantageous when the bicomponent fibers contain a co-polyester (CO-PES) as a low temperature melting component and a polyester (PS) as the higher melting temperature component.

In a further particularly important embodiment of the invention, the melting point of the heat meltable binding fiber or of the low temperature melting component (e.g. CO-PES) of the multi-component fiber is lower than a melting temperature of the micro staple fiber. For example, micro staple fibers can be used made from a polyester material having a melting temperature of approximately 256 °C and the CO-PES-PES bicomponent fibers can have a melting point for the CO-PES low melting temperature component of 110 °C and a melting temperature for the higher melting temperature component PES of 255 °C. In this case, a

thermal strengthening of the non-woven fiber can be effected without having the higher melting temperature component of the bicomponent fibers or of the micro staple fibers undergo a thermal change.

The non-woven pad in accordance with the invention is preferentially compressed in such a fashion that the longitudinal strength or the highest tensile strength in a longitudinal direction (machine direction) assumes values of 5-30 N/25 mm, in particular 10 to 25 N/25 mm and preferentially > 15 N/25 mm and a maximum tensile strength in a transverse direction (perpendicular to the machine direction) of 5-30 N/25 mm, in particular 8-20 N/25 mm and preferentially > 10 N/25 mm. This maximum tensile strength can be measured in a standardized tensile testing machine in according with DIN 51221 using the following testing method: A sample having a clamped width of 25 mm and a clamped length of 30 mm is removed from the middle region of the cotton pad which is to be examined. The sample is clamped in a horizontal position into the clamping receptacle of the standardized tensile testing machine and the sample is pulled apart at a test speed of 100 mm/min in a plane of its extension and the tensile strength in this direction is measured. The highest tensile strength is the maximal strength at which the pad tears. Should higher strength peaks occur during the stretching procedure, then these strength peaks correspond to the maximum tensile strength within the sense of this test. Advantageously, one can measure the longitudinal and transverse strength directions, corresponding to the direction of the machine and the direction transverse thereto, by preferably carrying out five individual measurements and calculating an average value thereof.

The pad in accordance with the invention has a thickness of preferentially 0.5 to 4.5 mm which is determined under a specific measurement pressure of 0.5 kPa on a sampling surface of 25 cm^2 of a sample of the material to be tested. The testing procedure corresponds to DIN ISO 9073-2 (testing procedure for non-woven materials, determination of the thickness).

Furthermore, the absorptivity of the pad in accordance with the invention can be determined using PH.EUR 1997, Monograph of Composite Pads made from Cotton, a Test of the Absorptivity by Determination the Sinking Time of a Wire Basket filled with the Testing Material in a Liquid. The wire basket used for this test is a cylindrical basket made of copper wire having a wire diameter of 0.4 mm. The basket has a height of 80 mm, a diameter of 50 mm and a wire grid spacing of 15-20 mm as well as a mass of 2.7 ± 0.3 g. A beaker glass is used having a diameter of 11-12 cm.

5 g of the pad material to be tested is inserted into the wire basket. Prior thereto, the wire basket is weighed to a precision of 0.01 g (M1). The 5 g constitute the mass M2. The beaker glass is then filled with demineralized water up to a height of approximately 100 mm and the filled basket is dropped into the water from a height of 10 mm. A stop watch is used to determine the time taken to sink below the surface of the water. Directly following termination of the sinking duration, the basket is lifted out of the water and its longitudinal axis is held horizontally and allowed to drip for 30 seconds. After the dripping time has elapsed, the basket is introduced into a calibrated beaker glass (M3) and precisely weighed to a precision of 0.01 g (M4).

The water retention capacity is defined as

$$g/g = \frac{M4 - (M2 + M3)}{M2 - M1}$$

The sinking duration and the water retention capacity are determined as an average value of three measurements. Preferred pads have a sinking time of at most 15 seconds and the water retention capacity is at least 10 g/g. This can be achieved by selecting the fraction of absorbing fibers and/or through the addition of hydrophilic materials.

Clearly, the cosmetic pads in accordance with the invention can have arbitrary sizes and shapes. By way of example, round shapes, oval shapes, quadratic and rectangular shapes are possible.

Further features, details and advantages of the invention can be extracted from the associated claims and from the drawings as well as from the subsequent description of a preferred embodiment of the invention.

Fig. 1 shows an illustration of a cosmetic pad in accordance with the invention.

Fig. 2 shows a cut representation of the cosmetic pad of Fig. 1.

Fig. 3 shows an enlarged partial view of the cross-section from Fig. 2; and

Fig. 4 shows a further embodiment of a cosmetic pad in accordance with the invention having an abrasive material deposited in a striped pattern.

Fig. 1 shows a perspective view of a cosmetic pad 1 in accordance with the invention. Fig. 2 is a representation of a cut view. The pad consists essentially of a wad of non-woven material comprising cotton fibers 11, on one side of which a powdery thermoplastic abrasive material is distributed and attached to the cotton pad by sintering.

The grain size of the abrasive powder utilized assumes values of 50-300 µm which is applied in an amount of 10-40 g/m^2. The abrasive powder can be colorless or be colored.

The abrasive material preferentially comprises a copolyamid with a melting range of 110-127 °C.

The schematic representation of Fig. 3 shows that the abrasive particles 10 are fixed on the surface of the fibers, but, do not penetrate deeply into the fiber composite. In this manner, the abrasive particles can effectively act to enhance the peeling effect in a non-restricted fashion, as is desired for the intended application of the pad.

The outer surface of the particles themselves have corners and edges which are only slightly rounded by the softening procedure occurring during sintering so that there is no risk of improper loading and agitation of the skin.

This fiber surface between the abrasive particles is freely accessible so that even the surface which has the abrasive material is available for absorption, cleaning, and for retention of body fluids.

Fig. 4 shows an additional embodiment of the invention. The abrasive powder 10 is applied to one side of the pad in a striped pattern.